phlebitis, a prompt and active treatment should be adopted in the early part of the disease, to prevent its passing into the suppurative stage.—*Journ. Psycholog., Med.* Jan. 1849, from *Archives Générales de Méd.*

CHOLERA.

64. *Chemical Examination of the Liquid Vomited during Cholera.* By ALFRED S. TAYLOR, F.R.S.—The specimen which was submitted to examination was delivered to me by Mr. Kite, medical superintendent of the Tooting Asylum for pauper children, with the following account of the case:—"The fluid was the matter vomited by a child, nine years of age, who was suddenly taken ill while at school, at 11 A.M., on the 3d of January. The first symptom was diarrhœa, followed by vomiting of the undigested food, the child having had breakfast between seven and eight o'clock—*i. e.* more than three hours before the first attack of vomiting; she had not complained of diarrhœa previously. The breakfast consisted of a mixture of gruel and arrow-root, with bread. After the first vomiting the extremities became cold, and the pulse weak and feeble. The vomiting and diarrhœa continued, the former the more constant, and collapse became complete. She complained of pain at the epigastrium, but there were no cramps; the tongue was furred, and the matter vomited assumed the appearance of rice-water; the dejections were likened by the nurses to soapy water. The fluid brought to you was thrown up very soon after the first vomiting, when the undigested food was rejected; it was in fact the production of the second vomiting, and immediately poured from the vessel into the bottle. The usual remedies were adopted—calomel, ammonia, opium, stimulants, and warmth externally, but without effect. The case proved fatal at 1 P.M. on the 5th of January, fifty hours from the appearance of the first symptoms."

The *liquid* was turbid, and when shaken appeared like dirty water. When left at repose, a sediment of a curdy-looking insoluble white substance subsided. There were no distinct traces of food, with the exception of a few husks resembling those of barley undigested. Iodine water gave no blue colour either with the sediment or the clear liquid. There was no indication of the presence of blood. The white deposit had the appearance of pus, and had none of the ropiness of mucus. The supernatant liquid had the colour of very pale or diluted serum. Its specific gravity was found to be 1·012. One hundred grains submitted to evaporation at a gentle heat on a sand bath, yielded 3.3 grains of solid extract, resembling a layer of brown varnish. This residue yielded by incineration 0.8 grs. of saline matter, almost entirely soluble in water. The only alkali detected in the aqueous solution of the ash, was soda. This solution had a slightly alkaline reaction (alkaline carbonate), and was abundantly precipitated by nitrate of silver, the precipitate being insoluble in nitric acid. A salt of baryta gave a very slight precipitate (sulphate of baryta). There was no trace of a soluble phosphate, nor could any insoluble phosphate (of lime) be detected in the residue. The ash, therefore, consisted of chloride of sodium, sulphate of soda, and carbonate of soda, the first-mentioned salt forming not less than three-fourths of the whole.

The clear serous liquid was without remarkable odour, and had a slightly acid reaction. It became very frothy by agitation. A portion was boiled, without any coagulum, or even turbidity, being produced. It remained equally unchanged on the addition of strong nitric acid, and no opacity was caused by ferrocyanide of potassium and acetic acid. Alcohol and pyrophosphoric acid produced in it no change. It was therefore obvious that the liquid contained no albumen. Acetic acid did not produce in it any change: casein and mucus, in a soluble or diffused form, were therefore absent. Muriatic acid was added to it, and it was allowed to stand for a few hours, but there was no change indicative of the presence of the colouring principle of bile; and nitric acid did not indicate the presence of this secretion. A slip of white paper plunged into it and dried did not present any yellow tint. When a small quantity was boiled with pure caustic potash holding dissolved, oxide of lead, it became perceptibly darker, indicating the presence of sulphur in the animal matter diffused through it. It was abundantly precipitated by nitrate of silver (owing to the chloride of sodium contained in it), slightly by the nitrate of baryta (sulphate), abundantly by the acetate of lead (from organic matter), the greater part being re-dissolved by a small quantity of nitric acid; and it was not affected by the addition of alum. Protonitrate of mercury produced in it a dense white precipitate, and there was no separation of oxide of mercury, such as is produced on adding this salt to albumen, serum, or gelatine: corrosive sublimate rendered it slightly opaque, but produced in it no precipitate. Tincture of galls threw down an abundant white precipitate which was not re-dissolved on boiling. When mixed with solution of caustic potash in the cold, and acetic acid was added to the mixture, no precipitate was produced. I have found that a precipitate has been uniformly produced on subjecting albuminous or serous liquids to this mode of testing. On adding sulphate of copper to the liquid, and subsequently caustic potash, the oxide was re-dissolved, forming a light blue solution; but after boiling, no deposit of red oxide of copper was procured.*

The constitution of this liquid was therefore—

	Animal matter, ...	2.5
Salts	Chloride of sodium in large proportion,	.8
	Sulphate of soda, ...	
	Water, ...	96.7
		100.

The carbonate of soda was no doubt a product of the decomposition of the organic matter. The acidity of the liquid may have been due to the presence of some organic acid.

The *solid white deposit* was quite soluble in boiling caustic potash, and yielded, on the addition of oxide of lead, the usual evidence of the presence of sulphur. The potash-solution obtained by boiling the sediment in the caustic alkali, was rendered opaque on the addition of acetic acid: but no excess of the acid caused it to become again clear. The alkaline solution was also precipitated by diluted nitric acid, and the precipitate was not re-dissolved by an excess of the acid. The white sediment was soluble in boiling concentrated nitric acid, and the acid solution was precipitated by dilution with water. When drained of water and covered with strong acetic acid, it did not swell up—a property which is characteristic of fibrine, nor could it be obtained in a state of solution by the addition of distilled water, and exposing it to a boiling heat. When boiled with concentrated muriatic acid, it became dissolved, and formed a reddish purple solution, which gave a pinkish white deposit when diluted with water. In this property it resembled the action of muriatic acid on what Mulder has designated the compounds of protein. To another portion of the sediment, caustic potash was added, but it did not become gelatinous, or assume that appearance which is observed in pus when thus treated.

From the result of this analysis, it appears that albumen is not necessarily a constituent of the choleraic liquid, although there are many theories respecting treatment, based on the assumption that the blood forces out its serum through the intestinal mucous membrane. Not a trace of albumen existed in the specimen here examined; fibrine was also absent, as there was no spontaneously coagulable principle, and the sediment was insoluble in acetic acid. The animal substance dissolved in the clear liquid, differed from gelatine in the fact that it yielded sulphur, and had no tendency to gelatinize. The animal matter may have consisted of bile altered by disease, or of some morbid animal product poured out by the blood under the influence of the choleraic poison. The large quantity of chloride of sodium contained in it is consistent with the view generally entertained by pathologists, that, under an attack of cholera, this salt is abundantly excreted from the system,—not by the kidneys, (for the urine has been found deficient in chlorides,) but by the gastro-intestinal mucous membrane.

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* The production of a blue solution under these circumstances is not an indication of the presence of sugar, unless the oxide of copper should be reduced by boiling.

The chemical nature of the evacuations of cholera patients has been examined by various pathologists. In the *Comptes Rendus* for 1847, M. Andral gives an account of the fecal evacuations. The most important fact which he observed, was the entire absence from these liquids of the serum and fibrine of which it was supposed they chiefly consisted. He could not discover in them any trace of albumen; and M. Favre also found, as the result of his analysis, that the organic substance contained in the choleraic liquid, possessed none of the properties of albumen. The observations of these pathologists are strikingly confirmed by the results of the analysis in this case. M. Andral was then induced to examine the blood, and he found that the proportion of albumen was almost unaltered. There was neither manifest increase nor diminution. Dr. Buchanan states, that in a certain stage of the disease, which he denominates the albuminous, he has found the evacuations in cholera to contain albumen. It would thus appear that their composition is liable to vary. It will be observed that the liquid examined in the present case was the product of the second vomiting in an early period of the attack, and more than three hours after food had been taken.

In the paper published by M. Andral, he speaks of the fecal evacuations in cholera having a highly alkaline reaction, like serum; but in this respect his opinion appears to have undergone some change. At a recent discussion in the Academy of Sciences, he states that he has almost constantly found the vomited matters to be *acid*, as well as the mucous membrane itself. The liquids discharged by vomiting and purging have hitherto been regarded as similar, and the more recently expressed opinion of Andral is in conformity with the fact observed in the present instance. M. Burguieres states that the vomited matters in cholera were evidently acid, but he commonly found them mixed with portions of food partially digested. This gentleman also states, that after the patients had vomited three or four times, the acidity disappeared, and they became alkaline. The alkaline reaction especially existed when the vomited matters assumed the white and flocculent appearance characteristic of the evacuations of cholera. Dr. Heller found that the matters vomited during the progress of the disease were very watery, and of a greenish or yellowish green colour. They also had a slightly acid or neutral reaction; and from his examination he considered bile to be the principal ingredient. This pathologist observed that the chlorides were almost entirely absent from the urine.

The nature of the white sedimentary matter appears to be very obscure. It did not in this instance present the physical and chemical characters of coagulated albumen, fibrine, mucus, or pus. It bore a strong resemblance to the last mentioned morbid compound, with the exception that it behaved differently when treated with potash: besides, the deposit was mixed with a quantity of white curdy matter altogether unlike pus in its appearance and chemical properties. M. Andral, who has also carefully examined this peculiar deposit, states that it does not consist of fibrine: under the microscope he could not trace any filamentous structure. He found it to be composed of numerous nucleated and nucleolated cells, closely resembling pus-globules. Besides these globules, which were very abundant, the masses contained numerous particles of epithelium.

One fact appears clear from these researches, that the cholera liquid is not to be regarded as a mere excretion of the watery parts of the blood mixed with fibrine. At the commencement of the attack, the vomited matters are acid, and mixed with a morbid product analogous to pus, but differing in properties from all the organic compounds hitherto found in the living healthy body.—*Lond. Med. Gaz.*, Feb. 2, 1849.

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65. *Microscopic examinations of the Mucous Membrane of the Stomach and Bowels in Cholera.*—Dr. Ludvic Boehm, who has received the appointment of successor to Dieffenbach in the surgical klinik at Berlin, devoted considerable attention to the microscopical anatomy of cholera, when raging in Germany; and since the subject must necessarily be of the greatest interest, and the present not an inappropriate period to introduce it, I will endeavour, as briefly as possible, to give a *précis* of the seven chapters in which he has described the